STATE OF NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANNING AND PROGRAMMING DIVISION

PRIORITY SYSTEM REWRITE
BUSINESS CASE

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IT Division

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VERSION CONTROL

Date	Author	Change	Reviewed and\or Approved By
04/21/04	Brian Bieber	Initial version done for 05-07 budget.	Doug Faiman
2/08/06	Todd Metzger	Project Origination – A review and modification of the initial assessment done nearly two years earlier.	Doug Faiman Bob Fode

PROJECT DESCRIPTION

Type of Project

_____ New Initiative
__X__ Major Enhancement\Upgrade
_____ Application Replacement
_____ Ongoing Initiative

Initially the scope and budget for this project was from the 2005-2007 budget estimates, which were created in April of 2004. The project was to modify the process to schedule construction projects by work type. Work types are a more detailed description of actual work needed on the roadway.

The Priority System is a process where construction projects are identified, prioritized, and assigned a budget. Once a year, from October 1 to December 1, the District Engineers are to compile a list of road improvement projects, construction projects, and rank them in a priority order. On December 1 they are to send their lists to the central office, the Planning & Programming Division to be specific, which in turn compiles the list for the entire state. The list is then sent back to the Districts for the Engineers final review. Planning then ranks that list on a state wide level and assigns a budget to the projects using the current investment strategy. Once that process is complete the data is keyed into the PDPG application, which in turn produces the STIP report. The public is then notified of the intended projects and comments are taken into consideration. The final STIP report is used to apply for federal money to fund the projects. Once projects make it thought this process, the Construction Division schedules them to be bid on by contractors and a construction project is born.

The project scope, as estimated in early 2004, is an enhancement of the Planning and Programming Divisions Priority System. However, after reviewing the current needs of the agency and the added federal requirements on related systems such as PDPG and STIP, we have discussed incorporating these other systems into the rewrite. The current application is an antiquated system residing on the Mainframe and built in Natural using a DB2 database. The current systems do not allow users to economically and effectively produce the desired results. They spend most of their time copying data to spreadsheets in order to manipulate the data, set priorities, etc. This makes the entire process ineffective and less productive for the department. A rewrite of the Priority system integrating the PDPG and STIP functions will not only streamline the entire process, but make the department more efficient and productive by saving time and allowing staff to concentrate on the task of getting the transportation system to be a safe and economical means of moving people and goods.

BUSINESS NEED\PROBLEM

The initial assessment showed the business function for scheduling construction projects has changed. The past practice had construction projects scheduled by funding type which is too broad of a blanket to plan and schedule construction projects. Also the scoping of construction projects has significantly changed and will need to be enhanced. This would give planners a better picture of what the scope of the construction project will be before it goes into the design stage. Scoping limits the design alternatives, which aids in the design stage of a project. It also helps the Planning & Programming Division determine the scope of a project and the associated costs.

After reviewing the needs of the agency and divisions, the initial assessment needs to expand to include processes that have come to light since the initial assessment. Changes to the project would now need to include new federal reporting requirements as stated in SAFETEA-LU for the STIP, the shift that has taken place in the department's investment strategy, the lack of ability for the District Engineers to access and review items within the current application, and the overall disjointed process of gathering the information. Some of the deficiencies of the existing systems include:

- Disjointed process of getting the initial lists from the District Engineers
- Doesn't have the ability to create\change district priorities to a global view
- The time limitations placed on the District Engineers to input their lists – two month window
- The pre-STIP review of the lists by the District Engineers is challenging
- Information needs to be mail back and forth taking time and money (draft STIP, News releases)
- Other District Engineer restrictions (access to the system, communication)
- The Entry Process is cumbersome and requires addition record keeping throughout the process. Currently information is being tracked in separate spreadsheets by the DE's then input into the system. The central office then takes the information out of the Priority system and uses another spreadsheet to manipulate the priorities.
- DE's need to generate the priorities on a spreadsheet, then input into the application.
- The Approval Process
- The Lack of a Global (statewide) View for the Central Office and Districts
- Lacks a visual representation; GIS has not been incorporated into the system. The projects listed in the STIP should generate a map for the report and for internal use.
- Not all RIMS data is available in the current system
- The system is not user friendly – Not all the needed information is displayed on the same page
- Antiquated System written in 1996

Some of the desired changes to the system would include the following enhancements and integrations:

- Provide a user-friendly application
- Web based application
- Flexible Segment Definitions
- Remove the time limitation for the DE's to enter their information, while still maintaining the cut-off time of December 1st
- Include Scoping Reports
- Provide the Bridge Division a means of inputting their priorities.
- Global view for the Central Office and the Districts
- Ability to create\change district priorities to a global view
- Ability to view the current investment strategy, which roughly change every five years
- Ability to Categorize by Type of Work (Grade, Surface, Thin Lift Overlay, PE, etc), or by Funding (Rural, Urban, TE, etc)
- Ability to view RIMS data (Load, Rut, Ride, PRPI, Distress, etc)
- The system should suggest priorities (rank) based on other RIMS data (Load, Rut, Ride, PRPI, Distress, etc)
- GIS functionality to generate maps for Reports (Including STIP), Websites, and Construction Maps
- STIP Posted to the Web
- Integration of the following systems:
  - STIP
  - PDPG system, which was created to aid in the planning process for Highway projects
  - Word for STIP
  - Integration of the Highway Performance Classification System (HPCS)
- Public Notification features such as:
  - News Releases to Public
  - E-mail Notification to DE's
  - List-Serves
  - Website
- Additional Reporting Functionality
  - Colored Reports
  - Multiple Sorting Capabilities
  - Maps

PROPOSED SOLUTION

The initial solution was to modify the existing mainframe application (custom built) to include granularity needed for District Engineers to correctly identify and rank projects within their district.

This project now gives us the opportunity to move the application off the mainframe, which ITD is in the process of eliminating, while streamlining the entire process. One option discussed would be moving from Natural\DB2 to newer development tools such as Websphear\Oracle and the internet. This application would be similar to the current CARS application where the District Engineers would be able to input and retrieve information, print reports, and provide feedback to the central office in timelier manner.

After researching the web and talking to other sources, it appears that there is not an off the shelf solution available. Therefore, this will need to be a custom built application, conforming to office standards, developed either in-house (ITD) or contracted out. ITD has the expertise as J2EE (Websphere) application developers and have knowledge of the current system. ITD developed the current application and related applications. Their rates are among the lowest compared to the ITD Vendor Pool contractors. Their cost estimate is defined later in this document.

With the level of funding yet to be determined, the exact solution of this project, in terms of scope, will be determined and documented as part of the Project Charter. Bob Fode, the Planning & Programming Director, and Doug Faiman, the IT Director and project sponsor, will determine if additional funding can be obtained. If additional funding is obtained we will proceed with the complete project. If the additional funding is not obtained the enhancements will be prioritized and we will proceed with what we can accomplish at the current funding level.

CONSISTENCY

This project is the very definition of the North Dakota Department of Transportation's mission of "providing a transportation system that safely moves people and goods".

The product of this project will allow agency personnel to prioritize construction projects to ensure that the appropriate roads are maintained or replaced at the appropriate time. This will all be done while taking into consideration the limitations of the legislated budget, federal funds, and federal, state, and local requirements.

This project also directly ties into the Department of Transportation's Strategic Initiative number 1:

Initiative 1
North Dakota will strategically prioritize its use of transportation resources.

Strategy 1: Engage public- and private-sector transportation providers and users to develop priorities for system improvements.

Strategy 2: Apply the priorities developed in Strategy 1 to guide transportation investment decisions.

Strategy 3: Research and develop financing options to protect, enhance and improve North Dakota's transportation system.

Strategy 4: Determine the impact of strategic investment priorities by monitoring and evaluating the transportation system's characteristics.

Prioritizing the use of transportation resources is difficult but critical.

- How should we target our limited transportation resources?
- Should we concentrate on developing load-free highways before we eliminate existing height restrictions?
- Is ensuring ride quality more important than widening and paving road shoulders?
- Are longer runways more critical than airport terminal improvements?
- Are rail crossing projects such as grade separations a higher priority than noise abatement projects?
- Are transit services that provide access to work more essential than those that provide access to social and recreational activities?

As well as touching nearly every other initiative:

Initiative 2: Define levels of transportation service.
Initiative 3: Enhance communication and facilitate cooperation and collaboration.
Initiative 4: Define and improve performance of transportation corridors and facilities.
Initiative 5: Incorporate economic competitiveness in investment strategies.

Initiative 6: Analyze load limits and establish program to coordinate administration.
Initiative 7: Determine feasibility of inter-modal freight facilities.
Initiative 8: Determine opportunity for regional uniform truck size, weight, and permitting.
Initiative 9: Use Intelligent Transportation System to enhance performance and safety.
Initiative 10: Conduct statewide freight origin and destination study.
Initiative 11: Create program to facilitate economic development and competitiveness.
Initiative 12: Promote public-private partnerships.
Initiative 13: Participate in regional and national transportation studies and programs.
Initiative 14: Increase emphasis on safety and security.
Initiative 15: Develop a statewide personal mobility plan.
Initiative 16: Monitor trends to identify potential transportation impacts and opportunities.

COST BENEFIT ANALYSIS

Anticipated Benefits

The new process would allow the agency to identify more low-to-medium cost highway projects. The DOT would be able to increase the overall quality and perhaps quantity of highway projects completed. Planners would have a better handle on the type and amount of work needed on our highway system. The system would provide a global view and incorporate GIS functionality, which are severely lacking in the current system. It would also remove the DE's time limitation and give them the ability to Categorize by Type of Work (Grade, Surface, Thin Lift Overlay, PE, etc), or by Funding (Rural, Urban, TE, etc). Some additional benefits to the system would be to provide a user-friendly web based application with flexible segment definitions. The main goal of the project is to reduce the extensive manual labor that is taking place, provide the users with more information, and to provide the users with more functionality.

Cost Estimate

This project was initially estimated, by DOT staff for budgeting purposes, to cost $156,600 during the 05-07 biennium, and $26,790 for maintenance during the 07-09 biennium. However, with the changes due to federal reporting requirements in STIP, a shift in the department's investment strategy, the limitations the District Engineers had using the application, and the disjointed process of gathering the information, a revised estimate was needed. ITD was utilized to provide an estimate to get a more complete representation of what the new enhancements would cost. The revised cost estimate came back at $255,525, with a time frame of 18 months to complete.

The desired enhancements will also have an impact on department staff time. The initial estimate included 680 hours of IT staff time, which would cost $21,760. The revised estimate will increase staff time to an estimated 1,560 hours ((2080 hours\year x 1.5 years) x 50% of staff time), which will cost $49,920 (1560 hours x $32\hour).

The total project cost, including IT salary costs, has increased from $178,360 to $305,445 for a difference of $127,085. Without IT salary cost the increase is $98,925.

The following is a breakdown of the desired enhancements:

Investment Costs	
Transfer System, **as is**, from Mainframe\DB2 to Websphear	$118,972
Desired Enhancements to the System	
Flexible Segment Definitions	$17,000
Remove the time limitation for the DE's	$0
Include link to the Scoping Reports	$5,500
Provide Bridge Division a means of inputting their priorities	$5,500

Global view for the Central Office and the Districts	$30,000
Include link to view the current investment strategy	$5,500
Categorize by Type of Work (Grade, Surface, Thin Lift Overlay, etc)	$5,500
Categorize by Funding (Rural, Urban, TE, etc)	$5,500
Ability to view RIMS data (Load, Rut, Ride, PRPI, Distress, etc)	$5,500
Ability to set priorities (rank) based on other RIMS data (Load, Rut, Ride, PRPI, Distress, etc)	$5,500
GIS Functionality	$5,500
STIP Posted to the Web	$5,500
Create STIP report and integration of PDPG	$16,000
Incorporate Highway Performance Classification System (HPCS) into the system	$4,000
Public Notification features: News Releases, E-mail Notification, List-Serves, Website	$4,000
Additional Reporting Functionality: Colored Reports, Multiple Sorting Capabilities, Maps	$9,550
Additional 5% added for possible scope changes	$6,503
Total Investment Costs	**$255,525**

Ongoing Costs	
Estimated ITD Application Server Hosting - $585/Month	$7,020
Estimated ITD Disk Storage Costs - $10/Month	$120
Total Annual Costs	**$7,140**

Cost\Benefit Analysis

The initial analysis showed the business process has changed over the past several years and the software had not kept pace with that change. This system is antiquated and will be completely obsolete within a couple of years. In addition, there are a substantial number of manual processes that are taking place due to the deficiencies in the current system. This results in a large amount of lost productivity by DOT staff. This project would implement federally mandated changes while increasing the efficiency of the agencies staff. The main benefits of the project will be to reduce the extensive manual labor that is taking place, provide the users with more information, and to provide the users with more functionality.

In summary, the goals of the project will be:

- Implement Federal mandated changes
- Increase staff efficiency
- Provide the users with more information
- Provide the users with more functionality

Note:

- The goals and benefits will be quantified and the cost benefit analysis further

detailed as the Project Plan is developed.

PROJECTED RISKS

- The initial assessment showed there are many systems that are tied to the Priority system, which will need to be addressed.
- The desired implementation date of October 1, 2006, is not a realistic goal due to the short amount of time and resources available.
- With the eight different districts, each performing their own methods of prioritization, it maybe difficult to get consensus on a standard format for reporting, etc.
- The Project Managers work load maybe taxing to the point of causing delays in the project.
- The initial assessment was only focusing on a specific shortcoming in the application. We are now looking at addressing all the deficiencies in the system and funding may be an issue.

Note:

- These and other potential risks will be further defined in the Project Plan.

BUSINESS CASE APPROVAL

I have reviewed the Business Case for this project and understand the desired enhancements and outcomes of the project. I endorse the continued process of the project by having the project charter and project plan developed.

Signature Date

Bob Fode, P.E.
Planning and Programming Engineer

Doug Faiman
IT Director

Comments:

Bob and Doug both agree that the additional funding, $98,925, which does not include the IT salary costs, will come from the Pavement Management project. The Pavement Management project will be started toward the end of this biennium after the department has a chance to research what other states, Wyoming in particular, are implementing for their asset management systems.